APPENDIX D

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BIOSOLIDS MANAGEMENT PLAN SUMMARY (REVISED)

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BIOSOLIDS MANAGEMENT PLAN SUMMARY

FOR THE

WEST CONTRA COSTA

BULK MATERIALS PROCESSING CENTER

~~December 2002~~February 2004

PREFACE

The West County Landfill (WCL) is continuing its program of working with the adjacent West County Wastewater District (WCWD) in management of the biosolids generated from the District's Public Operated Treatment Works (~~POTW~~WWTF). This document summarizes the activities planned at the Landfill to receive, process and recover the biosolids. Materials from other ~~POTW~~WWTFs may be received if within the ability of the WCL to handle the materials. This program is part of the WCL Bulk Materials Processing Center (BMPC).

The biosolids management program also is proposed to include processing a portion of the biosolids materials in the WCL Composting Program. A full composting permit is being requested for the upsized composting operation to expand the scope from the existing Green Material Composting Permit held by the WCL.

This summary includes the following aspects of the biosolids management program:

1. Background Information
2. Biosolids Handling Concepts
3. Biosolids Description
4. Possible Co-processing With Other Materials
5. Location of Handling Facilities
6. Specifications for Biosolids Spreading and Drying
7. Runoff Control
8. Processed Biosolids Removal
9. Protection of Landfill Cap and Annual Maintenance Activities
10. Other Environmental and Operational Factors
11. Monitoring and Reporting
12. Facility Cleanup and Closure Activities

1. BACKGROUND INFORMATION

Contractual arrangements have been made between the WCL and the WCWD for the landfill company to provide for annual cleanout and disposal of the ~~POTW~~WWTF biosolids. The long-term permit agreement was established in 1999. The two entities have been cooperatively investigating the possible ways that areas of the WCCSL could be used for biosolids drying and the manner of using the processed materials.

The goal of these studies is determining how an alternative manner of biosolids handling can be conceived and permitted, thus allowing for replacement or reduction of use of the existing WCWD biosolids lagoons. During 2000 and 2001 the lagoon-dried biosolids were successfully used as soil amendment materials on the final caps constructed on the MSW landfill. Currently the biosolids removed from the drying lagoons contain greater than 50% solids and require no further drying before use at the WCCSL.

This summary primarily covers the proposed spreading of the biosolids on specific site areas as soil conditioner and the processing and recovery of the materials. One program involves the annual spreading of biosolids on final capped areas of the landfill as an annual activity to improve the erosion control vegetation growing conditions. This may include both the MSW landfill and the closed Hazardous Waste Management Facility. The second program envisions use of the southern ~~and eastern~~ MSW landfill slopes as locations for annual repetitive spreading and drying of high moisture content biosolids.

As mentioned in the Preface, the biosolids management program also is proposed to be affiliated with biosolids composting at the WCL.

2. BIOSOLIDS HANDLING CONCEPTS

The following information is directed to spreading and drying the biosolids on the MSW landfill slopes. This presents the outline of the concepts for segregation, storage, spreading and processing of the materials. This operation may also be applicable to using portions of the Hazardous Waste Management Facility ~~if~~ as allowed by the approved Postclosure Plan and the DTSC Permit.

Delivery of Biosolids

Delivery by truck – The moisture content of the biosolids that can be trucked to the WCL can cover an extensive range. Biosolids of high moisture content (e.g. ~~25~~ to 10% solids) can be hauled in a tank truck. Lower moisture content materials (20% solids or greater) can be hauled by a dump truck.

Spreading of the biosolids carried by truck to the WCL involves unloading the materials at both the top of slope and at the base.

This requires the trucks to have unencumbered access to these spreading areas. The access roads available to be used by the trucks and the biosolids application areas are shown on Figure 3H-1.

Only the lower moisture content materials area are applicable to unloading the biosolids at the bottom of the slope to be spread up the slopes with a dozer.

Delivery by pipeline – The transportation of biosolids through the pipeline for the 4000 foot distance between the ~~POTW~~WWTF and the WCL spreading area requires the material to be less than of about 6% solids.

WCL envisions the transport pipeline to be buried in an alignment that extends from the northwest gate of the ~~POTW~~WWTF and runs parallel to the leachate pipelines passing by the power plant and the HWMF leachate treatment facility. This pipeline is shown in approximate location on Figure M1. Aboveground pipes would run along the top of the east and south landfill slopes.

Storage

At the WCCSL large volume storage of the high moisture content biosolids pumped from the ~~POTW~~WWTF probably is limited to ponds that would be created in Area A. This option would allow less lagoon area to be needed at the ~~POTW~~WWTF. However, Area A may be used as the location of the Waste Recycling Center, and hence may not be available. Wastes underlie all other areas at the WCCSL, and thus ponds cannot be used there. A 20,000-gallon tank may be established on the landfill central plateau to serve as a filling station for the spray truck.

Storage of lower moisture content materials trucked to the WCCSL would be in the form of unloading the biosolids in piles and rows at the top or base of the slope where they are to be spread. These truckload piles may sit in these locations for up to one week while awaiting the scheduled spreading of the material on the slope. Monitoring of the piles will be done by observing the pile area to detect any nuisance odors. Through experience in handling the stored biosolids, a management schedule

will be created to avoid odors, yet allow some moisture to be removed during the storage time, while sequencing the spreading operation to result in site equipment usage to be optimized.

During the wet weather season when spreading at the WCCSL is not possible, the biosolids produced by the WCWD and Richmond WWTFs would require storage in the existing lagoons. If storage of the biosolids in the lagoons at the WCWD would require new measures of lagoon management, then the feasibility of such storage will need to be determined through the demonstrations and evaluations identified in the project EIR mitigation measure 10-7.

Spreading

Spreading of the lower moisture content biosolids carried by truck to the top of slope and at the base would be conducted using a dozer tractor. The tractor would move the materials from the storage piles and push them downhill or uphill.

The intent is to spread the materials in the area designated for that amount of biosolids to a depth of about 3 to 4 inches. After that layer has dried, in one or two weeks an additional layer can be applied.

Spreading of the pipeline-discharged high moisture biosolids may occur by gravity flow for the 100 to 200 foot distance down the slope. Further spreading of the accumulated application to achieve a uniform thickness layer would be accomplished using the dozer. Alternately, the liquid biosolids may be sprayed from a tank truck or through large diameter nozzle sprinklers. The truck would be driven above the bench roads and the biosolids would be sprayed downwind.

Drying

Solar drying will be the major mechanism to reduce the moisture contained in the biosolids lying on the slopes. Moisture removal also will be accomplished from wind blowing across the slopes. The drying will occur over a week or two during the sunny days of late spring, summer and fall. During lower temperature periods, the biosolids may skin over, trapping the moisture in the bottom of the layer. At those times, the dozer may be used to track through the materials and break the skin crust.

Another potential drying method is growing plants such as rye grass or wheat to consume the moisture of the biosolids spread during the wet weather season. This may be very applicable to the pipeline or truck spraying options since the spreading of the biosolids flowing down the slopes would resemble flood-type irrigation of crops and the spraying would sprinkle the liquid biosolids over the plants. At the appropriate time, the plant materials may be harvested from the slopes and processed in the composting facility, or be cut and baled for erosion control on construction areas.

Removal or Incorporation into Landfill Cap

If the dewatered biosolids materials are not to remain in place they will be removed by a dozer tractor, pushing the dried material to the base of the slope to the loadout areas.

Incorporation of dried biosolids in the final landfill cap involves determining that the new depth of biosolids is desirable. This may be through co-spreading of the biosolids with solidified wastes and soils. This mixture will add to the thickness of the final cap, providing additional protection of the landfill.

3. BIOSOLIDS DESCRIPTION

Sources

The adjacent West County Wastewater District and the Richmond WWTFs would be the major sources of biosolids processed at the WCL. Another possible source is the other WWTF in the West County area at Pinole. ~~Other possible sources are the other POTW~~WWTFs ~~in the West County area in Hercules and Pinole.~~ Additional ~~POTW~~WWTFs in the region may be served if sufficient biosolids handling capacity exists at the WCL.

Characteristics

The candidate biosolids are restricted to adequately digested biosolids that represent no health risks. The moisture content range will range from about 2 percent to 75 percent solids. In this discussion "high moisture content biosolids" are defined as having a moisture content of between 2 to 6 percent by weight.

Quantity

The quantity of biosolids generated per month at the WCWD averages about 2 million gallons at 2 to 5 % moisture. This is equivalent to 10,000 cubic yards per month at 5% solids or 8,500 tons per month. This amount does not include approximately the same magnitude of biosolids produced by the City of Richmond WWTF, which is also removed from the drying lagoons and managed at the WCCSL.

The biosolid quantities available from other sources are yet to be determined, but are expected to be only about 50% of the biosolid amounts generated by the WCWD and the City of Richmond.

Chemical Character

The biosolids are analyzed annually to provide a listing of the inorganic and organic chemical substances contained in the materials. No constituents of concern are anticipated from the expected ~~POTW~~WWTF sources of the biosolids. A listing of the results of laboratory analysis of the WCWD biosolids is included at the end of this Appendix.

4. POSSIBLE CO-PROCESSING WITH OTHER MATERIALS

A parallel program to the biosolids processing is the spreading of dredged materials generated by local bay and harbor dredging operations. Another group of materials that may be spread on the slopes is the solidified materials developed from the processing of the wet wastes/powdery materials. Prior to the acceptance of any material, the generator's technical representatives must supply data to WCL, Inc. that shows the material meets the WCCSL acceptance criteria.

Dredged Materials

The dredged materials are the silty and sandy deposits removed from bay channels and harbors during dredging projects. These types and sources of materials have been identified in the BCDC dredged materials management alternatives evaluation. These are wet materials that require substantial drying and should only be spread to a depth of about one foot until dry.

Solidification Materials

WCL, Inc. proposes to operate a solidification program. Typical candidate materials are wet wastes and powdery materials that include silt biosolids from sumps and baghouse fines. The solidification is achieved by blending wet and dry materials or adding wet or dry soil to result in the desired moisture content and material plasticity.

Soil

Excess soils may be spread on the slopes to allow combining with biosolids or solidification materials, or to thicken the final cap. These soils would be those free of tree branches, rocks, concrete and rubbish.

Miscellaneous

Foundry Sand – The WCCSL receives foundry sand from the companies operating in Berkeley. After closure of the active landfill, an alternative handling method must be found. These dust prone materials can not be handled through a transfer station.

Sand Blast – Spent sand blast requires disposal and would make a good addition to the biosolids cake if the metals content is acceptable.

5. LOCATION OF HANDLING FACILITIES

Management Areas

The prime locations for the repetitive biosolids spreading areas are the south ~~and east~~ slopes of the MSW landfill. These locations are shown on Figure 3H-1.

The access routes to the ~~east and~~ south slopes are shown on Figures 3H-1. These include the main haul road climbing up to the top of the central plateau of the MSW landfill, and the south slope roads. The main access roads to the siting area are graveled and provide all-weather access. Maintenance grading is provided to assure that the appropriate road smoothness, surface drainage and dust control is maintained. These roads are also used for access to the other site areas. Site maintenance inspection and roads spur off of these roads allowing equipment to reach all parts of the slopes.

The area available on the south slope is ~~14~~ approximately 20 acres. ~~The eastern slope area is about 5 acres.~~

~~The liquid biosolids could be sprayed on other slope areas. Subsequently, these areas would be disked to incorporate the biosolids into the cover soil, or left as a thin layer on the vegetation.~~

Description of Side Slope Areas

The upper and lower south ~~and east~~ slope areas average a 3:1 horizontal to vertical slope angle. The length of the slopes range from 50 to 400 feet.

The slopes are covered with low vegetation in the form of weedy plants and grasses. Prior to application of the biosolids, the vegetation would be mowed or trampled with a dozer tractor to reduce the height of the vegetation to a few inches, if necessary.

Adjacent Uses At Landfill

Existing uses are the organics receiving and grinding area and the waste shuttle area. When the landfill closes, ~~one of the alternative areas for locating the Waste Recycling Center is~~ the waste solidification facility is planned to be located on top of the landfill central plateau, immediately above the south landfill slope.

~~Another potential~~The Alternate siting area of the Waste Recycling Center is Area A, which is at the base of the eastern slope and just east of the end of the southern slope.

The joint operation of the biosolids spreading area and the waste solidification facility and Waste Recycling Center at ~~either of~~ these areas should occur without any problems.

6. SPECIFICATIONS FOR BIOSOLIDS SPREADING & DRYING

The objective of the biosolids spreading is to apply the materials in a uniform manner over the area. The thickness of the new layer is selected to allow the biosolids to quickly dry in the sunlight and from the wind so that another layer can be spread on the biosolids processing slopes or to allow tilling or blending of the dried materials into the landfill final cap. If they are sprayed on the cover plants prior to the ~~day~~dry-weather season, the plants would in essence be irrigated with the liquid. Thus, the plants may stay green all summer, resulting in more moisture removal through evapotranspiration.

The moisture content of the biosolids governs the spreading method. Biosolids with high water content will flow down the slope. Those of lower moisture content will need to be spread down or up the slope with a low-ground pressure dozer tractor.

Spreading by Truckload

The concept is to deliver the low moisture content biosolids to the slopes adjacent to the access roads. Usually the intent is to spread the materials down the slope. Very high moisture content biosolids (2 to 6% solids) would be hauled by a tank truck and the materials would be sprayed through a nozzle directly onto the slopes. Also they could be spread from a hose and allowed to flow down the slope. Possibly they could be discharged directly from the truck and be allowed to flow down the slope. Biosolids with lower moisture content would be carried to the spreading area in a dump truck. The truck would dump the load at the top of the slope, and sometimes at the base of the slope. The dozer tractor would uniformly spread the biosolids down or up the slope.

Spreading via a Piping System

Due to the large number of tank truck loads that would be required to ~~handling~~ handle the annual generation of the ~~POTW~~WWTF biosolids, it may be desirable to pump the high moisture content biosolids directly from the ~~POTW~~WWTF through a buried pipeline that links the treatment plant with the top of the landfill. Pipelines ~~are being~~ were constructed during 2002-2003 for leachate handling and non-potable water delivery to the landfill. A pipeline and the pumping system with lateral pipelines running along the top of the south and east slopes could be included ~~in the~~ as a future project.

The manner of discharging the biosolids may be via a hose to spray the materials onto the slope. An alternative manner of biosolids discharge may be through a piping system which large-sized holes drilled every foot or so that will allow the sludge to be discharged along the slope top.

The pipeline could also be connected to the storage tank located on top at the central plateau.

Specifications for Reuse as Dried Biosolids

The amount of moisture in the processed biosolids will be related to the intended use of the biosolids.

Dried biosolids to be used for soil conditioner usually will contain from 20 to 40 percent moisture. The higher the moisture content, the heavier the ~~load which~~load, which affects the transportation of the product.

No chemical constituents are anticipated to be present in the dried biosolids that would restrict the use of the materials as soil conditioners.

Specifications for Reuse of Biosolids Mixed with Soil

The finished dried biosolids mixed with soil will contain from 20 to 40 percent moisture.

The chemical nature of the biosolids/soil mix is expected to be neutral. Both the biosolids and the soils placed on the processing area will be checked to assure that no excessive contaminant levels will occur.

To prepare the biosolids and soil for mixing, the soil and biosolids will be spread in layers. This will involve several alternating layers of biosolids and soil. When the layers are excavated during the removal of the materials from the slopes, mixing will occur. As the hauling trucks are loaded, additional mixing will occur.

Specifications for Incorporating into Side Slope Final Cover

The dried biosolids to be incorporated into the slope final cover will contain from 20 to 60 percent moisture. The mixing method will determine the amount of acceptable moisture content. If the materials are to be plowed into the upper layer of the landfill cap, the moisture content could extend across the entire range. To mix the materials by track-walking the slope with a dozer requires the materials to be drier, probably less than 40 percent moisture.

The anticipated areas where the dried biosolids would be incorporated into the final cover include the western end of the landfill, the northern side, the eastern side, and the southern side facing the north side of the HWMF.

To create better vegetation growing conditions, dried biosolids may also be mixed into the HWMF final cap vegetative soil layer. After spreading, the materials may be left in place of several weeks to achieve further drying before incorporating them into the vegetative soil layer.

If the drying lagoons are no longer used at the ~~POTW~~WWTF, then the dried materials to be spread on the final cap areas will be obtained from the ~~east or~~ south slope biosolids processing areas.

Specifications for Composting the Biosolids

One method of composting the biosolids is to directly apply the wet biosolids from a tank truck to the windrows. This would add both nutrients and moisture to the green materials being composted.

It may be desirable to first process the biosolids by storing them on the slope spreading areas. For example, the compost operation cannot receive much high moisture content biosolids during the wet weather season. Some biosolids may be spread down the south slopes during the dry weeks that periodically occur during the rainy season. Then in April-May these semi-dried biosolids could be removed and be placed in the compost windrows for processing into compost. If the biosolids have been dried on the slopes to remove sufficient moisture for composting, the moisture content may range from 30 to 60 percent.

Rates of Repetitive Spreading on the Processing Areas:

Table 1 presents an initial estimate of the amounts of biosolids that can be placed on the available WCL slopes. The assumptions and general calculations are shown, giving the range of materials that can be accommodated on the slopes. Approximately ~~22~~ 20 acres appear to be available.

The rate of spreading is dependent upon the time required to dry the biosolids to the desired moisture content. A 3-inch thick layer of biosolids may dry within one week if the daily maximum temperature exceeds 70 degrees and some wind is present. Cooler temperature will require greater times. Spraying the biosolids from a tank truck will be limited by the tendency of the liquids to run down the slope. A vegetated surface will hold more liquids then a bare soil slope.

The estimated application amounts range from about 2,900 gallons per acre to 8,700 gallons per acre. Assuming that applications can be made four times per month, then from 260,000 gallons to 770,000 gallons can be applied per month. The applications can only be made during the 5 dry weather months between April and October.

Truckloads – The above monthly ranges equate to 4 to 12 truckloads per day.

Pipeline or tank truck discharge – The above monthly ranges equate to 8,700 to 26,000 gallons per day.

The above estimated rates will be re-evaluated after the test-spreading program. WCL, Inc. has conducted a limited test spreading of the biosolids to gather additional information that can be applied to the design of the pipeline spreading and truck spraying option. The tests conducted in 2002 confirmed the feasibility of applying the 2% to 6% solids content biosolids on the landfill slopes.

In the test applications conducted in 2002 the following were noted. Two test procedures were conducted during summer 2002. The first was the direct bulk placement of the liquid biosolids on the vegetated final capped landfill slope from the back gate of the tank truck. The second involved spraying the biosolids through a hose, pump and nozzle connected to the tank truck.

In the first test, approximately 2000 gallons were unloaded in about 5 minutes from the tank truck when parked at the top of the 3:1 H:V slope. The biosolids quickly fanned out downslope in approximately a 20-foot wide swath. But, much of the liquid ran in concentrated flow approximately 6 inches to 1-foot wide downslope through the 6 to 12 inch high dried browned-off vegetation. The liquid evaporated within several days and no penetration into the soil cover occurred. It was apparent that to obtain a more consistent application, the biosolids would need to be discharged through a diffuser pipe laid at the top of the slope, or they should be sprayed on the

hillside.

Page for Table 1

Table 1

APPLICATION OF BIOSOLIDS TO SPREADING AREAS
VOLUME OF LIQUIDS APPLIED

Example 1
SPREADING RATE = 1 GALLON/5 SQ FT

Zone	Area Acres	Area Sq Ft	Rate 1/5 gal/sf	Quantity Gallons
1	3.2	140000	5	28000
2	9.9	430000	5	86000
3	5.1	220000	5	44000
4	4.4	190000	5	38000
Total	22.5	980000		196000

Example 2
SPREADING RATE = 1 GALLON/15 SQ FT

Zone	Area Acres	Area Sq Ft	Rate 1/15 gal/sf	Quantity Gallons
1	3.2	140000	15	9333
2	9.9	430000	15	28667
3	5.1	220000	15	14667
4	4.4	190000	15	12667
Total	22.5	980000		65333

Notes:

Quantity in gallons represents the amount per application

Assumes uniform spreading of the biosolids over available area

Berm at base of each slope intercepts and routes runoff water

The second test involved spraying two 4000-gallon tank truckloads on the slope. Due to the equipment used and the approximately 15 mph wind conditions, the liquid biosolids were sprayed up the final capped slope. This allowed effective observation of the runoff pattern and the biosolids spraying could be applied to different portions of the area (bare soil versus 12 inch deep dried vegetation) in durations that were varied to avoid runoff. Approximately 4 times more liquid could be applied to the vegetated area compared to the bare soil. The vegetation absorbed or restricted the water from flowing downslope. The spray application, using a monitor nozzle with a 1-inch opening, resembled a hydroseeding application that uses a low mulch content mix. With the equipment used and the wind conditions, the biosolids spray range extended up slope about 80 to 100 feet. The final result was a covering over the soil and vegetation less than $1/16^{th}$ inch thick. The application rates achieved in the test appear to have averaged about 0.5 gallons per sq ft on the bare soil, and 3 to 4 gallons per sq ft on the vegetated slope. The 4000-gallon load was sprayed over the hillside in about 10 minutes. The soil cover surface dried within several hours, with no penetration. It would appear that on a sunny, windy day that several spray applications could be made on the same day over an area.

Prior to full-scale implementation of the biosolids spreading, further testing will be conducted to refine the rates and methods of application.

7. RUNOFF CONTROL

This discussion primarily applies to the biosolids processing areas located on the south and east final capped slopes of the landfill.

After the biosolids spreading has been approved by all agencies, the biosolids spreading area will be named in the WCCSL Stormwater Control Program filed with the State. Sampling points will be established as described below.

Drainage Control

The drainage grading for the area above the processing area slopes will prevent the water from these upper areas from entering the slope area. The grades surrounding the processing area would be maintained such that drainage will flow around and away from the area.

Controls At Base Of Slope

The control concept is to place a berm at the base of the slope where the runoff water would be collected in a series of low points where pumps would be located in sumps. At the base of the slopes the landfill leachate pipeline is buried within a berm that overlies the final cap. That berm would be raised in height to contain the runoff and direct the water to the pump sumps. Grasses would be planted to transpire water and uptake nutrients in the ditches behind the berm. The locations of the runoff control berms and channels are shown on Figure 3H-1.

Runoff Handling – Pump to ~~POTW~~WWTF

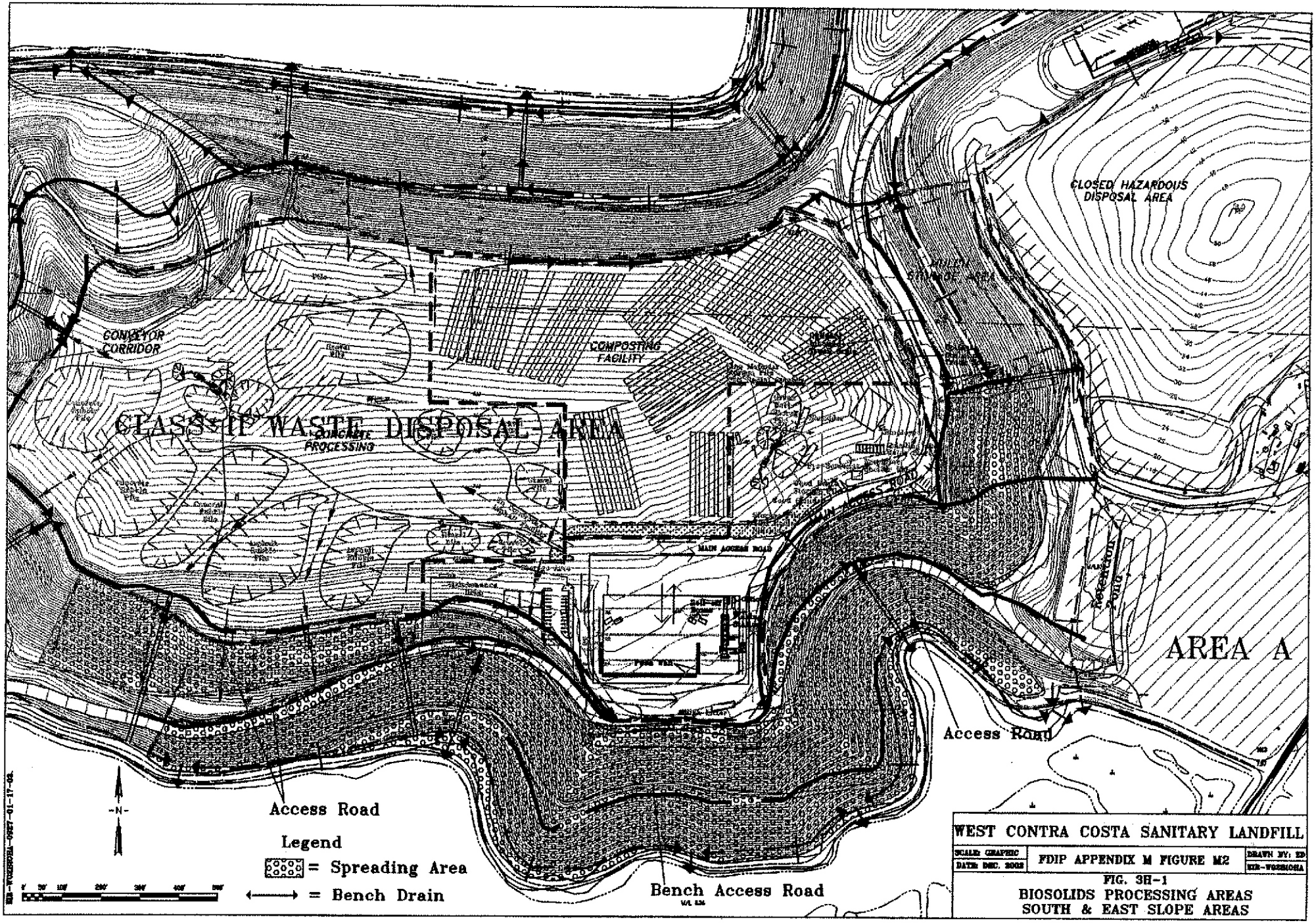
The water may be pumped into the leachate piping system used for the HWMF treated leachate discharge to the WCWD sewer. The amount of water from stormflow off 20 acres of WCCSL slope area would be similar to the water now ~~pumped~~ removed ~~off of the~~from an equilvalent area of existing biosolids drying lagoons at the WCWD ~~POTW~~WWTF. That rainwater now is decanted off of the ponds and ~~pumped back~~ sent by gravity flow to the ~~POTW~~WWTF headworks.

Pump To Top Of Slope For Evaporation

An alternative manner of handling and disposing the rainwater is to evaporate it on the slope. This option is only available during the last portion of the wet weather season. However, during the wet season usually during December or January, several weeks of dry weather occur each year. The runoff can be pumped to the top of the slope where it will evaporate after it wets the slope. This procedure may require an additional depth of about 2 feet of soil on the slope to provide additional soil moisture storage capablility during the wet weather season.

Stormwater Monitoring Sampling Points

Drainage from Areas Where Dried Biosolids are Spread as Soil Amendment on the Final Capped Areas – ~~The~~ These areas are the surface areas other than the repetitive application Southern Slope Spreading Area. In these northern, eastern and western slope areas the erosion control plants growing on the landfill cap uptake nutrients and consume large amounts of moisture. Some of the moisture infiltrates into the root zone during the wet season and is stored. Subsequently the plant transpiration process extracts this moisture until the plant withers during the dry season. The warm weather evaporation removes the remaining moisture.



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SCALE: GRAPHIC DATE: DEC. 2002	FDIP APPENDIX M FIGURE M2	DRAWN BY: ED EIR-WOODSIDE

FIG. 3H-1
BIOSOLIDS PROCESSING AREAS
SOUTH & EAST SLOPE AREAS

Stormwater moisture in excess of the soil field capacity will run off. For those areas where the biosolids have been placed in that year as soil amendment, WCL will maintain an unscreened compost windrow or shredded green material (approximately 8 feet wide and 2 feet deep) at base of the spreading area for first season. At the WCL this method has been shown to retain a significant amount of runoff from the periodic rainstorms, and the nutrients are absorbed in the windrow. In the second season the base of slope windrowed materials will be spread on the slope as a thin mulch layer. Observations will be made for rainfall runoff from these areas and to check that the runoff handling system is functioning as anticipated.

The application of biosolids on the northern, eastern and western final capped slope areas will follow a rotational pattern. A specific annual area will be designated and used that year, and that area probably will not receive the next application for 5 to 10 years. Monitoring results from the areas used will provide information that will indicate the next scheduled application time.

Drainage from Processing Areas – The processing areas will essentially be in a disturbed condition during the entire year as the repetitive spreading and drying cycles occur. No plants will be present on the slopes initially in the wet weather season. Thus, the rainfall runoff could contain suspended and settleable solids, and dissolved nutrients. These rainfall runoff flows will require containment. At the processing areas, runoff drainage will be diverted at the base of slope. This design feature is described earlier in this section. The water will flow to pumps that will pump the runoff back to the top of the slope during times of no rainfall, or discharge the water into the leachate discharge line utilized to normally deliver batches of HWMF treated leachate effluent to the WCWD. Hence these rainwater flows would not be discharged into the Class II site leachate discharge pipeline and would not be diverted to the Richmond WWTF. No HWMF treated ~~landfill~~ leachate effluent will be pumped during the periods when the stormwater is being transported to the ~~POTW~~WWTF. The runoff volume should be less that the amount of rainfall that would have been collected in the same area of the existing drying lagoons, in as some water will be evaporated and shallow infiltration and temporary storage of the rainfall would occur on the slope.

8. PROCESSED BIOSOLIDS REMOVAL

This discussion applies to the biosolids processing areas located on the south and east final capped slopes of the landfill.

Method

A dozer tractor will push the biosolids to the base of the slope for loadout. The tractor operator will carefully skim off the layer of material leaving a thin residue to avoid removal of the final cap vegetative soil layer. The dried materials will be accumulated at the base of the slope and temporarily stockpiled. These storage zones are adjacent to the access roads.

A rubber tired loader will load out the stored materials into dump trucks for transport to the market location, to the composting facility, or to another slope area on the landfill for final spreading as soil conditioner. After removal of the dried biosolids, the tractor will backblade the slope to smooth it for the next application of biosolids.

The removal activities will be practically restricted to the dry seasons of the year when truck access is available to the loading area.

Equipment

The following equipment would be used:

- Tank truck to transport high moisture content biosolids to the composting facility or to the spreading slopes.
- Dozer tractor that would be used to spread the materials evenly on the slopes, and push the dried materials to the loadout area.
- Rubber tired loader used to load out the dried biosolids.
- Hauling trucks to transport the biosolids to the composting area or site slope areas, or to off-site use points.
- Water trucks for access road dust control.
- Pumps to handle slope stormwater runoff.

Schedule

The schedule will be set by the rate of drying that occurs on the slopes. It is preferable to spread multiple layers of materials on the slopes. The addition of soils and other solidified wastes will depend on the availability of those materials. The removal schedule will be determined when the biosolids moisture content has reached the desired levels for subsequent marketing of the material or for composting. Also, the scheduling of the dried biosolids removal may be related to preparing the slope for the upcoming wet weather season.

9. PROTECTION OF LANDFILL CAP &ANNUAL MAINTENANCE ACTIVITIES

Description of Caps

The Class II site final cap is composed of compacted soil. The soil profile is composed of 2 feet of foundation soil, 1 foot of compacted clay and 1 foot of vegetative soil. The clay soil forms the moisture barrier layer that prevents moisture infiltration into the buried landfilled wastes.

The HWMF final cap is more unique, comprised of a composite soil and geomembrane structure. The vegetative soil layer is 18 inches thick which will permit incorporation of the dried biosolids in the final cap.

Potential Impacts To Be Avoided From Biosolids Handling Procedures

Infiltration of moisture into cap – The biosolids processing areas are on the sloping hillsides of the Class II landfill. The standard landfill final cap on these slopes is a 4-foot thickness of compacted soil. One foot of compacted soil overlies the 1-foot thick clay barrier layer. A 2-foot thick foundation soil layer underlies the clay layer. One of the prime purposes of the final cap is to minimize the infiltration of moisture into the cap.

Deep infiltration through the clay layer should not occur on the slope. The high moisture biosolids would wet the top few inches of the topmost soil layer as the liquid was wicked down from the biosolids materials into the soil. However, as the biosolids dried, the top of the soil layer will also dry.

Since, the repetitive spreading operation is planned to achieve substantial drying of the biosolids before the next application, it will be several ~~weeks~~ days before the next application is made. This will allow the soil to partially dry.

Experience has been gained in evaluating the cap moisture control function. In 1999 test holes were made into the Class II Site final cap to determine moisture penetration from the normal rainfall. This was conducted as part of monitoring of the cap to obtain information in HWMF cap design evaluation.

In the October ~~1998~~ 1999 tests, the in-situ dry vegetative soil was very firm and non-friable. Digging the holes required substantial effort to hand dig down through the 1-foot thickness. The maximum depth where the roots were noted was 9 inches in the 1996 final cap area.

The rooting depth range of the other test holes was 3 to 6 inches. The excavations were made in areas of the slope where the plants were growing as high as 5 or 6 feet. However, in digging the test holes, when these larger height plants were removed such as from the center of the hole, the primary roots generally did not extend below 2 or 3 inches. The vegetative soil was very dry, whereas the top of the clay barrier layer was moist. It was easy to stick a screwdriver several inches into the clay, as compared to it would not penetrate into the overlying vegetative soil. However, no roots were noted on top or in the top few inches of the clay soil layer even though soil moisture was present.

These results show the limited infiltration potential through the clay cap and the effects of the shallow-rooted grasses and weedy plants acting to remove the moisture.

Additional information is available from the ongoing Potrero Hills Landfill Engineered Alternative Final Cap investigation. At that landfill, a test area on the 3:1 final cap slope is instrumented with moisture sensors that track the moisture profile of a 60-inch thickness or depth of the soil cap. Figure 3H-2 portrays data from the Potrero Hills Landfill study and is included here for reference.

The graph shows at the beginning of the wet season that the moisture content of the surface soils immediately increases with the onset of rainfall. Several weeks after more rainfall, the 12" depth soil layer shows a moisture increase. However, even after 5 months of wet weather, the 18" depth soil layer shows no impact of rainfall infiltration. The data collection and observation shows that the deeper soils (18" to 60" depth) remain with relatively unchanged moisture levels after ~~5~~ 6 years of annual rainfall.

At the WCL, even with continuous use of the ~~eastern and~~ southern slopes for biosolids processing, a similar wetting and drying cycle is expected, since the periods between biosolids applications will allow for loss of some of the extra moisture added by the biosolids during the dry weather period.

During the initial years of the biosolids applications at the WCL, soil moisture monitoring is planned to gain knowledge of the annual soil moisture pattern in the cap profile. The monitoring would be conducted on the materials applied during the first year of application. Prior to full-scale implementation further testing would be conducted to refine the rates and methods of application, under the review and oversight of the RWQCB as listed in EIR Mitigation Measure 6-4. Upon completion of the additional biosolids spreading trials WCL will prepare a Progress Report for RWQCB review and approval. The Progress Report would include, at a minimum, the following: (a) Purpose of Biosolids Spreading, (b) Approach and Methodology, (c) Results of the testing, (d) Environmental Controls, (e) Conclusions and Recommendations, and (f) other reporting components deemed necessary by the RWQCB. The Progress Report should demonstrate the maximum acceptable biosolids loading rate, given available site area and physical constraints, and the need to maximize drying and to control runoff. Revised permits would be obtained as necessary and the WCL would abide by the permit conditions.

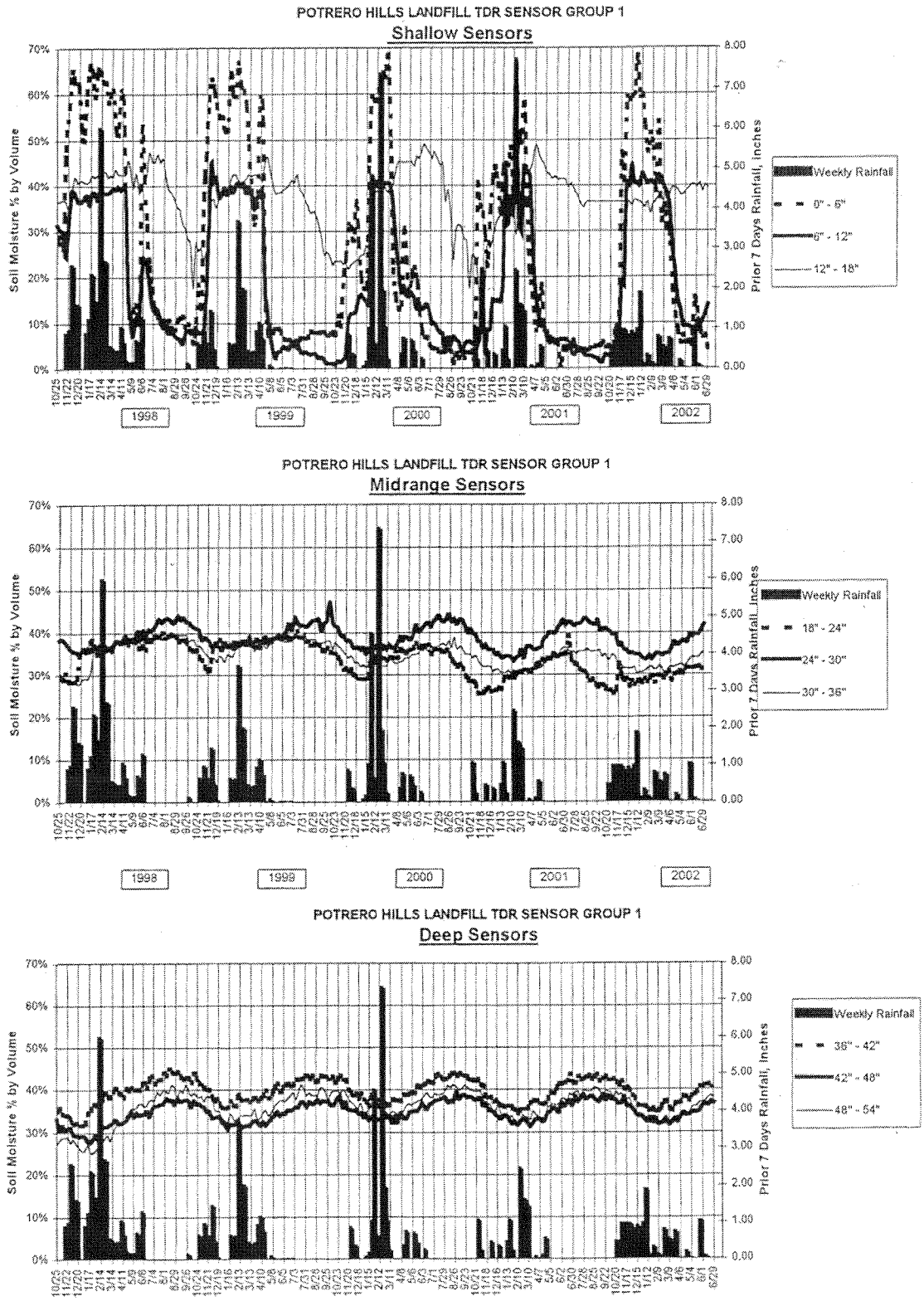

Figure 3H-2 Soil Moisture Trends 1997-2002

Removal of Final Cap Soil – The periodic movement of tractors on the final cap could threaten the cap integrity if proper operation practices are not followed. Prior to use of the ~~eastern and~~ southern slope areas for repetitive placement and removal of the biosolids, additional soil would be placed on the slopes. This will provide a buffer on top of the existing final cap that now has been constructed.

Steps will be taken to the include a marker layer similar to those used in the buffer layer underlying the resource recovery operations located on the landfill central plateau.

Creation of nuisances – Proper operational techniques will be developed and followed to avoid creation of nuisance odors and water quality impacts. These measures are described elsewhere in this Appendix in Section 7 (Runoff Control) and Section 10 (Other Environmental and Operational Factors).

Monitoring and Maintenance

Periodically in May-June, moisture content sampling of biosolids layers and the final cap vegetative soil layer will be conducted by driving 1" or 2" diameter soil sampling tubes extending down to the top of the clay barrier layer. ~~Periodically in May-June, moisture content sampling of biosolids layers and the final cap vegetative soil layer will be conducted by driving 1" or 2" diameter soil sampling tubes extending down to the~~

~~top of the clay barrier layer.~~ The holes will be immediately backfilled with bentonite chips to reseal the hole. Seed mix will planted at the top of hole if appropriate (if no new biosolids application is anticipated before next season). The moisture content of the soil samples will be determined using proper ASTM methods. The results will be recorded and reported.

Annually, the depth of the buffer layer in the biosolids processing areas will be determined to guard against removal of the cap soil as the biosolids are graded across the hillside or removed from the slope. This involves shallow test holes made to measure the soil thickness existing above the marker layer.

10. OTHER ENVIRONMENTAL AND OPERATIONAL FACTORS

Comparison With Existing Drying Lagoons

The biosolids that would be processed on the WCL slopes primarily would include those that are now lagoon-dried in the WCWD lagoons. A number of these ponds are adjacent to the Richmond Parkway. The existing Bay Trail bike path passes along the east side of these ponds (along the west

side of the Parkway). A new trail linking the Wildcat Creek and WCL public access trails may be created along the west side of the ~~POTW~~WWTF, and hence adjacent to the existing western ponds.

The locations of the WCL biosolids spreading slopes are much more remote from public thoroughfares. An exception is the eastern slope area if the Waste Recycling Center is located in Area A. The access roadway to the WRC facility located there would pass along the base of the eastern slope area. Fencing would be in place to restrict public access to the biosolids processing area. WCL will probably not use the eastern slope for repetitive biosolids spreading if the Area A location is selected for the WRC facility. Biosolids may be applied to the final capped slopes as soil conditioner material.

Public Health Aspects

The biosolids to be applied, composted or otherwise utilized at the WCL will be limited those that have been adequately processed through the normal ~~POTW~~WWTF biosolids digestion processes. These have reduced health impact significance as compared to raw biosolids sludge. However, the handling of these materials at the WCL must ~~do~~ be done with caution and effective notification of possibly affected parties.

Only employees who have been trained in the proper biosolids handling procedures, conditions and operations to be avoided, and good manner of health protection will be allowed to participate in the biosolids-handling program at the WCL. Proper protective equipment (clothing, masks, goggles, etc.) will be provided. Follow-up observation of working practices and re-training will be conducted quarterly to assure continuous respect for the public health aspects of this operation are being routinely followed. These training sessions will also allow feedback from all participants regarding improvements that can be made in the handling process or changes in the manner of monitoring and controlling the operation.

Compliance will be maintained with the Project EIR Mitigation Measure 11-7 such as proper inoculation of biosolids management employees, demonstration of the character of the lagooned biosolids, and demonstrations of the public health protection effectiveness of a combination of trail closure, rotational dried biosolids spreading, and fencing. Demonstrations will also be provided to the RWQCB and LEA to show compliance with the vector attraction reduction requirements of 40 CFR 503 regulations.

The biosolids will not be placed in any area where the public can have contact with the materials.

This includes the public access trail area of the western and northern landfill slopes. Biosolids placed in those areas will be done only when the areas are closed and fenced off to prevent public access, and when the materials will be disked into the shallow soil mantel of the landfill cover. At proper setback distances from the edges of the biosolids application area, fences will be erected and maintained and signs will be posted indicating the boundaries of the area and warning unauthorized persons to not enter the area. The materials will not be applied near the toe of the western and northern landfill slopes so that the lower shoreline trail can be maintained in use to the fullest extent .

The spraying of the biosolids has the potential to cause wind drift of the biosolids liquid in mist or fine droplets form to adjacent areas. The operators of the spray equipment will be thoroughly trained to watch and assure that the materials are applied to the intended surface. Through experience, limits will be established for various wind speeds that will involve establishing setback distances from adjacent areas or outright halting of spraying. The spraying pattern will be done to avoid the biosolids from being blown back onto the operator or the equipment. The intent is to spray in the downward wind direction.

The annual report will contain a summary of the public health aspects of the preceding year's operation including a review of the health protection procedures that were employed and corrective measures that were or need to be taken.

Aesthetics

Persons traveling down the Richmond Parkway and the Bay Trail located along the Parkway can view the WCL.

More distant views occur from the hillside residential areas to the east and south. When the Public Access Trail is opened around the eastern and southern perimeters of the WCL property, that will create the nearest observation point to the biosolids processing area. The nearest distance ranges from 300 to 900 feet. Figure 3-6 in chapter 3 shows the trail locations envisioned on the landfill. When dried biosolids are placed on the western and northern final cap slopes, portions of the Trail will need to be taken out of service for the 4 or 6 week period while the temporary fencing is installed and when the materials are being spread on the hillside. The areas nearest the trail will be mulched with straw to return the area to the seasonal brown and tan color of the adjacent hillside vegetation.

The appearance from offsite areas and the Public Access Trail will entail observation of the equipment periodically operating on the slope to spread out the materials. Also, periodically the processed material removal activities will be seen. These areas are sufficiently distant from the trail such that the appearance should not be negative, other than the trail user may have wished to have a

recreational hiking or biking scene with no commercial enterprise visible. The noise should not be distinguishable over the ambient noise of the nearby refinery operations.

Use of the ~~eastern~~ southern slope spreading area, adjacent to the ~~access road leading to the~~ Waste Recycling Center if it is located in Area A, should not be aesthetically displeasing. The operation would resemble construction~~s~~ projects that have been common at the landfill.

Litter Control Measures

The litter control requirements of LUP Section 24 and CUP Section 22 would apply to this operation. Due to the biosolids and soil materials being handled, little litter should be created. In addition to those methods described in the FDIP report, no specific litter control measures would be needed.

Odors

The odor control requirements of LUP Section 23 and CUP Section 20 would apply to this operation. No nuisance odors are expected since the thickness of the biosolids layers will be maintained such that anaerobic conditions should not occur. The musty odor of the biosolids may be present at times similar to that which occurs when the existing drying lagoons are plowed. The biosolids being applied will be monitored for nuisance odors. Odorous materials will be rejected from being managed at the WCCSL.

The liquid biosolids spreading demonstration program work plan identified in EIR Mitigation Measure 10-7 would be prepared, under the review and oversight of the LEA and BAAQMD. The goal is to demonstrate whether residual odor would be consistent with the impact standards of the BAAQMD and the project EIR. The work plan would include the items listed in the EIR on types of biosolids, data to be collected and application methods. This demonstration project would be conducted under the review and oversight of the LEA and BAAQMD.

Transportation

Pipeline and Storage Tank – The transport pipeline from the pumping station located at the ~~POTW~~WWTF will be placed underground passing through the ~~POTW~~WWTF, through the WCL front entrance area and through the WCL Area A.

Temporarily the pipeline will be placed on the ground surface where it runs up the grade to the edge of the central plateau. Later this pipeline will be placed underground after the initial major settlement of the landfill has occurred. A 20,000-gallon tank may be placed on the central plateau to serve as a filling station for the tank truck spraying operation.

Inbound Trucks – The number of trucks depends upon the amount of ~~POTW~~WWTF solar drying lagoons continued in service by the WCWD. If the biosolids are pumped to the WCL drying area, or to the storage tank then few numbers of trucks would be used annually. As now occurs, the dried biosolids materials contained in the remaining lagoons in August and September will be hauled out over a several week period and placed on the final capped slopes, or possibly composted. Currently about 800 truckloads are involved annually over about a one month duration.

Outbound Trucks – Periodically trucks will be used to transport the finished dried biosolids or soil/biosolids mix to the point of use off-site.

Water Supply

Water is not required for the biosolids processing operation, except for the haul roads. Dust control in the nearby area and on access roads will be accomplished by spraying water with the site water trucks per existing permit requirements. Drinking water for operations personnel is supplied via bottled water.

Pooling of Biosolids Liquids

Periodic smooth grading of the slopes should prevent pooling of biosolids liquids on the slopes. This would be done by a dozer back-blading the slope area.

Energy Consumption

Comparison with Filter Press and Centrifuge Alternatives – The solar and air drying of the biosolids on the slope is much less energy consumptive compared to the use of a filter press or centrifuge which require significant amount of electricity to operate. Some electrical power would be consumed in pumping the biosolids up to the WCL spreading areas, but it is expected to be only a small percentage of the mechanical dewatering energy needs.

Trucking to WCL areas – If a portion of the existing WCWD biosolids drying lagoons remained in operation, energy would be expended by the tractor plowing and tracking through the lagoons to dry the material, and the loadout and truck transport of the biosolids to the WCL. This removal effort would be less than for hauling the biosolids cake from the Filter Press or Centrifuge.

The lower moisture content lagoon dried materials would constitute less volume to be hauled, thus requiring fewer truck trips.

Handling of biosolids materials on slopes – The current limited information indicates that the amount of energy consumed in placing the materials on the final capped slopes as soil amendment would be approximately equal to the existing WCWD lagoon drying program. Handling the mechanical dewatered biosolids on the slopes to further dry them and combine with soil for recovery might be more energy intensive due to the need to spread them on the slopes with a tractor. However, the liquid biosolids spread at the top of the slopes may require multiple regrading of the layers on the slope to even the thickness of the biosolids. Spraying of the liquid biosolids from a tank truck may require the periodic tracking of the slope vegetation by a bulldozer to create a more uniform biosolids application. Mowing of the green slope vegetation may be necessary.

Fire Control

Due to the thin layer depth and low fire potential of the biosolids, no special measures are anticipated to occur. Compliance will be maintained with the FDIP fire control requirements (e.g. control of wildfires). If lush vegetation growth occurs due to the increased moisture and nutrient availability, at the end of the application season when the foliage dries and browns off, a bulldozer or mower may need to reduce the depth of the vegetation as a fire prevention measure.

Equipment Servicing Area

The equipment would be serviced as part of the BMPC equipment-servicing program. The WCCSL equipment maintenance personnel will accomplish the routine maintenance.

Dust Control

A water truck would be used to periodically spray the site access roads for dust control per existing permits.

Site Security

The primary security is the WCCSL exterior fence and gate located at the end of Parr Blvd. Persons traveling on the access road must pass the WCCSL scale house. The general public using the WCCSL would be excluded from the biosolids processing operation. Fencing would be installed

around the spreading areas used annually on the western and northern slopes containing the Public Access Trail. The postclosure plan will include a fence monitoring and maintenance activity. The biosolids storage tank and the tank truck filling area would be fenced and access would be limited to authorized WCL personnel.

Residuals Management (LUP Section 11.4 and CUP Section 9.3)

Certain excess vegetation material may be created seasonally, such as clearing plant growth materials from the slope prior to beginning the spreading operation. These materials can be disked into the slope, left in a crushed condition on the slope, or collected and delivered to the composting facility.

Contingencies

WCCSL, Inc. has established response programs for the cases of accidents, fires, and equipment malfunction. The site personnel are equipped with radios to maintain contact with the WCCSL office. A list of emergency contact numbers is maintained and the site has a Fire Control Plan and a Hazardous Materials Management Plan. No materials are anticipated to be used in the biosolids processing that would require identification in the WCCSL MSDS log and the Hazardous Materials Management Plan. One contingency plan is to provide pooling areas along the ditches on the south slope roads for the event where the biosolids are channeled down the slope and enter the ditch. Daily observation would be made of each channel. A monitoring log will be maintained to certify that the observations are being accomplished. The plan will anticipate that a tractor may be required on short notice to build a temporary berm to isolate such runoff (such as building up the bottom edge berm). Training of operators will be conducted annually to alert them of this possible scenario and to practice the control measures. Observations will be made of specific locations on the slopes where runoff periodically occurs, and either the biosolids applications will be reduced, or grading will be performed to achieve better areal coverage of the slope.

11. MONITORING & REPORTING

The following is a listing of the content of the monitoring and reporting program envisioned for the biosolids management program. The information will be tabulated monthly and provided to the agencies quarterly or upon request.

Quantities Handled – As applicable, specify the tons or gallons by percent moisture that are applied to the slopes. The composting program will identify the amount of biosolids that are composted.

Location of Processing Area – Indicate the area used per month (location and area size) coupled with the amount of material applied per area.

Schedule of Processing Per Area – Provide a summary of the processing time for the various application areas.

Quantities Removed – Indicate the amount of material removed from the various processing areas.

Runoff Monitoring -- monitor the amount and character of the stormwater runoff from the various processing areas

Soil Moisture Monitoring – Monitor the dept of moisture penetration due to biosolids spreading.

Public Comments – Provide a summary of comments received from the public

Reporting of Critical Events – The following will be reported:

Odor nuisance complaints
Lack of containment of biosolids
Grading corrections

Biosolids Buildup In Vegetative Layer Of Cap – monitor the thickness of biosolids stored on the various processing areas

Thickness of Cap Remaining Underlying Processing Areas - monitor the thickness of the vegetative soil layer above the clay barrier layer.

Monitoring of the Security Fences at Boundaries of the Biosolids Application Areas - monitor to assure the fencing and signing remain in good serviceable condition.

A report will be prepared and submitted to the appropriate agencies on the schedule that is established in the WCL permitting process. The report will contain descriptions of the above items for the monitoring period. Tables and maps will be included as applicable.

12. FACILITY CLEANUP AND CLOSURE ACTIVITIES

Schedule

There is no current estimate of when the biosolids spreading and application management method would be closed out if this biosolids management technique at the WCL is successful. The ~~POTW~~WWTF will remain at its present location for the foreseeable future. Biosolids generation will continue at the ~~POTW~~WWTF requiring disposal or recovery. This Section is contained in the Appendix to meet information needs and to interface with the WCL Class II Site Postclosure Plan.

Site Cleanup

For site cleanup, that thickness of the final biosolids layer that is not desirable to leave on the slope as soil amendment, will be removed. Also, any pipes that are not needed for other purposes will be removed. The remaining biosolids will be mixed into the underlying materials and the plant seeding will occur in October.

Postclosure Site Monitoring and Maintenance

For the period specified, the normal WCL Postclosure Plan monitoring and maintenance activities will be conducted similar to actions taken for the other final slope areas.

--- *West Contra Costa Sanitary Landfill, Inc.* ---
MEMORANDUM

3260 Blume Drive, Suite 200 Richmond, CA 94806 Phone (510) 262-1660 Fax Phone (510) 262-1656

February 19, 2004

To: Paul Scheidegger

From: Michael Boyle

Subject: WCWD AND COR SLUDGE LAGOON ANALYSIS FOR DRAFT EIR APPENDIX 3H

- Transmitted with this memo is the most recent analysis of the sludge from the combined West County Water District and City of Richmond Sludge lagoon. This information should be attached to the end of Appendix 3H.

If you have questions concerning the above information please contact me at (510) 262-1667 or Larry Burch at 262-1662.

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w eir info 2-19-04b

Sequoia Analytical

819 Striker Avenue, Suite 8
Sacramento, CA 95834
(916) 921-9600
FAX (916) 921-0100
www.sequoialabs.com

West County Wastewater District	Project: Annual Dry Sludge - Lot C	S310434
2377 Garden Tract Rd.	Project Number: N/A	Reported:
Richmond CA, 94801	Project Manager: Paul Stovall	11/10/03 15:28

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
LOT C Lagoon #12	S310434-01	Soil	10/17/03 00:00	10/17/03 12:10

Combined sludge WCWD + COR

TS = 73%

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West County Wastewater District 2377 Garden Tract Rd Richmond CA, 94801	Project: Annual Dry Sludge - Lot C Project Number: N/A Project Manager: Paul Stovall	S310434 Reported: 11/10/03 15:28

Organophosphorus Pesticides by EPA Method 8141A

Sequoia Analytical - Morgan Hill

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LOT C Lagoon #12 (S310434-01) Soil Sampled: 10/17/03 00:00 Received: 10/17/03 12:10									C-06, R-05
Azinphos methyl	ND	400	ug/kg	10	3121011	10/21/03	10/29/03	EPA 8141A	
Bolstar	ND	200	"	"	"	"	"	"	
Chlorpyrifos	ND	200	"	"	"	"	"	"	
Coumaphos	ND	400	"	"	"	"	"	"	
Demeton	ND	200	"	"	"	"	"	"	
Diazinon	ND	200	"	"	"	"	"	"	
Dichlorvos	ND	200	"	"	"	"	"	"	
Dimethoate	ND	400	"	"	"	"	"	"	
Disulfoton	ND	200	"	"	"	"	"	"	
Ethion	ND	200	"	"	"	"	"	"	
Ethoprop	ND	200	"	"	"	"	"	"	
EPN	ND	200	"	"	"	"	"	"	
Fensulfothion	ND	200	"	"	"	"	"	"	
Fenthion	ND	200	"	"	"	"	"	"	
[illegible]thion	ND	200	"	"	"	"	"	"	
Merphos	ND	200	"	"	"	"	"	"	
Mevinphos	ND	200	"	"	"	"	"	"	
Monocrotophos	ND	1000	"	"	"	"	"	"	
Naled	ND	400	"	"	"	"	"	"	
Parathion-ethyl	ND	200	"	"	"	"	"	"	
Parathion-methyl	ND	200	"	"	"	"	"	"	
Phorate	ND	200	"	"	"	"	"	"	
Ronnel	ND	200	"	"	"	"	"	"	
Stirophos	ND	400	"	"	"	"	"	"	
Sulfotep	ND	200	"	"	"	"	"	"	
Thionazin	ND	200	"	"	"	"	"	"	
Tokuthion (Prothiofos)	ND	200	"	"	"	"	"	"	
Trichloronate	ND	200	"	"	"	"	"	"	
Surrogate: Triphenyl phosphate		*770 %*	*20-165*	"	"	"	"	"	*S-01*

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West County Wastewater District	Project: Annual Dry Sludge - Lot C	S310434
2377 Garden Tract Rd.	Project Number: N/A	Reported:
Richmond CA, 94801	Project Manager: Paul Stovall	11/10/03 15:28

Total Metals by EPA 6000/7000 Series Methods

Sequoia Analytical - Sacramento

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LOT C Lagoon #12 (S310434-01) Soil	Sampled: 10/17/03 00:00	Received: 10/17/03 12:10							
Mercury	4.0	0.20	mg/kg	10	3100424	10/30/03	10/30/03	EPA 7471A	
Antimony	ND	10	"	4	3100380	10/28/03	11/05/03	EPA 6010A	
Arsenic	18	10	"	"	"	"	"	"	
Barium	300	10	"	"	"	"	"	"	
Beryllium	ND	1.0	"	"	"	"	"	"	
Cadmium	2.4	1.0	"	"	"	"	"	"	
Chromium	44	1.0	"	"	"	"	"	"	
Cobalt	6.2	4.0	"	"	"	"	"	"	
Copper	260	1.0	"	"	"	"	"	"	
Lead	82	10	"	"	"	"	"	"	
Molybdenum	5.1	4.0	"	"	"	"	"	"	
Nickel	49	4.0	"	"	"	"	"	"	
Selenium	ND	10	"	"	"	"	"	"	
Silver	13	1.0	"	"	"	"	"	"	
lium	22	20	"	"	"	"	"	"	
Vanadium	21	4.0	"	"	"	"	"	"	
Zinc	480	1.0	"	"	"	"	"	"	

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West County Wastewater District 2377 Garden Tract Rd. Richmond CA, 94801	Project: Annual Dry Sludge - Lot C Project Number: N/A Project Manager: Paul Stovall	S310434 Reported: 11/10/03 15:28

Volatile Organic Compounds by EPA Method 8260B

Sequoia Analytical - Sacramento

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LOT C Lagoon #12 (S310434-01) Soil Sampled: 10/17/03 00:00 Received: 10/17/03 12:10									R-01
Benzene	ND	0.025	mg/kg	5	3100390	10/28/03	10/28/03	EPA 8260B	
Bromobenzene	ND	0.025	"	"	"	"	"	"	
Bromochloromethane	ND	0.025	"	"	"	"	"	"	
Bromodichloromethane	ND	0.025	"	"	"	"	"	"	
Bromoform	ND	0.025	"	"	"	"	"	"	
Bromomethane	ND	0.12	"	"	"	"	"	"	
n-Butylbenzene	ND	0.025	"	"	"	"	"	"	
sec-Butylbenzene	ND	0.025	"	"	"	"	"	"	
tert-Butylbenzene	ND	0.025	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.025	"	"	"	"	"	"	
Chlorobenzene	ND	0.025	"	"	"	"	"	"	
Chloroethane	ND	0.025	"	"	"	"	"	"	
Chloroform	ND	0.12	"	"	"	"	"	"	
Chloromethane	ND	0.12	"	"	"	"	"	"	
lorotoluene	ND	0.025	"	"	"	"	"	"	
-Chlorotoluene	ND	0.025	"	"	"	"	"	"	
Dibromochloromethane	ND	0.025	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	0.025	"	"	"	"	"	"	
Dibromomethane	ND	0.025	"	"	"	"	"	"	
1,2-Dibromo-3-chloropropane	ND	0.12	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.025	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.025	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.025	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	0.12	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.025	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.025	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.025	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.025	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.025	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.025	"	"	"	"	"	"	
1,3-Dichloropropane	ND	0.025	"	"	"	"	"	"	
2,2-Dichloropropane	ND	0.025	"	"	"	"	"	"	
1,1-Dichloropropene	ND	0.025	"	"	"	"	"	"	
Ethylbenzene	ND	0.025	"	"	"	"	"	"	
Hexachlorobutadiene	ND	0.025	"	"	"	"	"	"	
Isopropylbenzene	ND	0.025	"	"	"	"	"	"	
p-Isopropyltoluene	ND	0.025	"	"	"	"	"	"	
Methylene chloride	ND	0.12	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	0.025	"	"	"	"	"	"	
Naphthalene	ND	0.025	"	"	"	"	"	"	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. Unless otherwise stated, results are reported on a wet weight basis. This analytical report must be reproduced in its entirety.

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West County Wastewater District	Project: Annual Dry Sludge - Lot C	S310434
2377 Garden Tract Rd.	Project Number: N/A	Reported:
Richmond CA, 94801	Project Manager: Paul Stovall	11/10/03 15:28

Volatile Organic Compounds by EPA Method 8260B

Sequoia Analytical - Sacramento

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LOT C Lagoon #12 (S310434-01) Soil	Sampled: 10/17/03 00:00	Received: 10/17/03 12:10							R-01
n-Propylbenzene	ND	0.025	mg/kg	5	3100390	10/28/03	10/28/03	EPA 8260B	
Styrene	ND	0.025	"	"	"	"	"	"	
1,1,1,2-Tetrachloroethane	ND	0.025	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.025	"	"	"	"	"	"	
Tetrachloroethene	ND	0.025	"	"	"	"	"	"	
Toluene	ND	0.025	"	"	"	"	"	"	
1,2,3-Trichlorobenzene	ND	0.025	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	0.025	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.025	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.025	"	"	"	"	"	"	
Trichloroethene	ND	0.025	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.12	"	"	"	"	"	"	
1,2,3-Trichloropropane	ND	0.025	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	0.025	"	"	"	"	"	"	
-Trimethylbenzene	ND	0.025	"	"	"	"	"	"	
Vinyl chloride	ND	0.12	"	"	"	"	"	"	
Xylenes (total)	ND	0.050	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane		*96 %*	*60-140*		"	"	"	"	
Surrogate: 1,2-DCA-d4		*97 %*	*60-140*		"	"	"	"	
Surrogate: Toluene-d8		*125 %*	*60-140*		"	"	"	"	
Surrogate: 4-BFB		*114 %*	*60-140*		"	"	"	"	

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West County Wastewater District	Project: Annual Dry Sludge - Lot C	S310434
2377 Garden Tract Rd.	Project Number: N/A	Reported:
Richmond CA, 94801	Project Manager: Paul Stovall	11/10/03 15:28

Semivolatile Organic Compounds by EPA Method 8270C

Sequoia Analytical - Sacramento

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LOT C Lagoon #12 (S310434-01) Soil Sampled: 10/17/03 00:00 Received: 10/17/03 12:10									R-06
N-Nitrosodimethylamine	ND	2000	ug/kg	1	3100409	10/29/03	11/06/03	EPA 8270C	
Phenol	ND	2000	"	"	"	"	"	"	
Aniline	ND	2000	"	"	"	"	"	"	
Bis(2-chloroethyl)ether	ND	2000	"	"	"	"	"	"	
2-Chlorophenol	ND	2000	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	2000	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	2000	"	"	"	"	"	"	
Benzyl alcohol	ND	2000	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	2000	"	"	"	"	"	"	
2-Methylphenol	ND	2000	"	"	"	"	"	"	
Bis(2-chloroisopropyl)ether	ND	2000	"	"	"	"	"	"	
4-Methylphenol	ND	2000	"	"	"	"	"	"	
N-Nitrosodi-n-propylamine	ND	2000	"	"	"	"	"	"	
Hexachloroethane	ND	2000	"	"	"	"	"	"	
ibenzene	ND	2000	"	"	"	"	"	"	
Isophorone	ND	2000	"	"	"	"	"	"	
2-Nitrophenol	ND	2000	"	"	"	"	"	"	
2,4-Dimethylphenol	ND	2000	"	"	"	"	"	"	
Bis(2-chloroethoxy)methane	ND	2000	"	"	"	"	"	"	
Benzoic acid	ND	5000	"	"	"	"	"	"	
2,4-Dichlorophenol	ND	2000	"	"	"	"	"	"	
1,2,4-Trichlorobenzene	ND	2000	"	"	"	"	"	"	
Naphthalene	ND	2000	"	"	"	"	"	"	
4-Chloroaniline	ND	2000	"	"	"	"	"	"	
Hexachlorobutadiene	ND	2000	"	"	"	"	"	"	
4-Chloro-3-methylphenol	ND	2000	"	"	"	"	"	"	
2-Methylnaphthalene	ND	2000	"	"	"	"	"	"	
Hexachlorocyclopentadiene	ND	2000	"	"	"	"	"	"	
2,4,6-Trichlorophenol	ND	2000	"	"	"	"	"	"	
2,4,5-Trichlorophenol	ND	2000	"	"	"	"	"	"	
2-Chloronaphthalene	ND	2000	"	"	"	"	"	"	
2-Nitroaniline	ND	2000	"	"	"	"	"	"	
Dimethyl phthalate	ND	2000	"	"	"	"	"	"	
Acenaphthylene	ND	2000	"	"	"	"	"	"	
2,6-Dinitrotoluene	ND	2000	"	"	"	"	"	"	
3-Nitroaniline	ND	2000	"	"	"	"	"	"	
Acenaphthene	ND	2000	"	"	"	"	"	"	
2,4-Dinitrophenol	ND	5000	"	"	"	"	"	"	
4-Nitrophenol	ND	2000	"	"	"	"	"	"	
Dibenzofuran	ND	2000	"	"	"	"	"	"	

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West County Wastewater District 2377 Garden Tract Rd. Richmond CA, 94801	Project: Annual Dry Sludge - Lot C Project Number: N/A Project Manager: Paul Stovall	S310434 Reported: 11/10/03 15:28

Semivolatile Organic Compounds by EPA Method 8270C

Sequoia Analytical - Sacramento

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LOT C Lagoon #12 (S310434-01) Soil Sampled: 10/17/03 00:00 Received: 10/17/03 12:10									R-06
2,4-Dinitrotoluene	ND	2000	ug/kg	1	3100409	10/29/03	11/06/03	EPA 8270C	
Diethyl phthalate	ND	2000	"	"	"	"	"	"	
4-Chlorophenyl phenyl ether	ND	2000	"	"	"	"	"	"	
Fluorene	ND	2000	"	"	"	"	"	"	
4,6-Dinitro-2-methylphenol	ND	2000	"	"	"	"	"	"	
N-Nitrosodiphenylamine	ND	2000	"	"	"	"	"	"	
Azobenzene	ND	2000	"	"	"	"	"	"	
4-Nitroaniline	ND	5000	"	"	"	"	"	"	
4-Bromophenyl phenyl ether	ND	2000	"	"	"	"	"	"	
Hexachlorobenzene	ND	2000	"	"	"	"	"	"	
Pentachlorophenol	ND	2000	"	"	"	"	"	"	
Phenanthrene	ND	2000	"	"	"	"	"	"	
Anthracene	ND	2000	"	"	"	"	"	"	
Carbazole	ND	2000	"	"	"	"	"	"	
Butyl phthalate	ND	2000	"	"	"	"	"	"	
Fluoranthene	ND	2000	"	"	"	"	"	"	
Pyrene	ND	2000	"	"	"	"	"	"	
Benzyl butyl phthalate	ND	2000	"	"	"	"	"	"	
3,3'-Dichlorobenzidine	ND	5000	"	"	"	"	"	"	
Bis(2-ethylhexyl)phthalate	13100	5000	"	"	"	"	"	"	
Benzo (a) anthracene	ND	2000	"	"	"	"	"	"	
Chrysene	ND	2000	"	"	"	"	"	"	
Di-n-octyl phthalate	ND	2000	"	"	"	"	"	"	
Benzo (b & k) fluoranthene (total)	ND	4000	"	"	"	"	"	"	
Benzo (a) pyrene	ND	2000	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	2000	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	2000	"	"	"	"	"	"	
Benzo (ghi) perylene	ND	2000	"	"	"	"	"	"	
Surrogate: 2-Fluorophenol		*46 %*	*39.2-113*	"	"	"	"		
Surrogate: Phenol-d6		*56 %*	*42.3-111*	"	"	"	"		
Surrogate: Nitrobenzene-d5		*61 %*	*43.5-113*	"	"	"	"		
Surrogate: 2-Fluorobiphenyl		*70 %*	*44.6-118*	"	"	"	"		
Surrogate: 2,4,6-Tribromophenol		*50 %*	*26.1-147*	"	"	"	"		
Surrogate: Terphenyl-d14		*124 %*	*36-144*	"	"	"	"		

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West County Wastewater District 2377 Garden Tract Rd. Richmond CA, 94801	Project: Annual Dry Sludge - Lot C Project Number: N/A Project Manager: Paul Stovall	S310434 Reported: 11/10/03 15:28

Conventional Chemistry Parameters by APHA/EPA Methods

Sequoia Analytical - Sacramento

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
LOT C Lagoon #12 (S310434-01) Soil	Sampled: 10/17/03 00:00 Received: 10/17/03 12:10								
Total Solids	73	0.10	% by Weight	1	3100397	10/28/03	10/29/03	EPA 160.3	HT-04

North Coast Laboratories, Ltd. Date: *29-Oct-03*

CLIENT: Sequoia Analytical
Project: S310434
Lab Order: 0310549

CASE NARRATIVE

EPA 632:
Some reporting limits were raised due to matrix interference.

The laboratory control sample/laboratory control sample duplicate (LCS/LCSD) recoveries were above the upper acceptance limit for carbaryl. These recoveries indicate that the sample results may be erroneously high. There were no detectable levels of the analyte in the sample; therefore, the data were accepted.

NORTH COAST LABORATORIES
5680 West End Road · Arcata, California 95521-9202 · 707-822-4649 · FAX 707-822-6831

Date: 29-Oct-03

ANALYTICAL REPORT

WorkOrder: 0310549

Client Sample ID: S310434-01 Received: 10/22/03 Collected: 10/17/03 0:00

Lab ID: 0310549-01A

Test Name: Carbamate and Urea Pesticides Reference: EPA 632 Modified

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
Oxamyl	ND	0.50	µg/g	1.0	10/23/03	10/28/03
Methomyl	ND	0.50	µg/g	1.0	10/23/03	10/28/03
Fenuron	ND	0.20	µg/g	1.0	10/23/03	10/28/03
Monuron	ND	0.20	µg/g	1.0	10/23/03	10/28/03
Propoxur	ND	0.50	µg/g	1.0	10/23/03	10/28/03
Carbofuran	ND	0.50	µg/g	1.0	10/23/03	10/28/03
Carbaryl	ND	0.50	µg/g	1.0	10/23/03	10/28/03
Fluometuron	ND	0.20	µg/g	1.0	10/23/03	10/28/03
Diuron	ND	0.20	µg/g	1.0	10/23/03	10/28/03
Propham	ND	2.5	µg/g	1.0	10/23/03	10/28/03
Siduron	ND	0.50	µg/g	1.0	10/23/03	10/28/03
Methiocarb	ND	1.0	µg/g	1.0	10/23/03	10/28/03
Linuron	ND	0.20	µg/g	1.0	10/23/03	10/28/03
Swep	ND	0.20	µg/g	1.0	10/23/03	10/28/03
Chlorpropham	ND	1.0	µg/g	1.0	10/23/03	10/28/03
Barbane	ND	5.0	µg/g	1.0	10/23/03	10/28/03
Neburon	ND	0.20	µg/g	1.0	10/23/03	10/28/03
Surrogate: Simazine	76.5	52.3-119	% Rec	1.0	10/23/03	10/28/03

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